

Unleash the Potential of CO₂ in Industrial Refrigeration

Single-screw compression platform delivers breakthroughs in CO₂ sustainability, performance and reliability.

SIMPLICITY

2

VILTER
by **COPELAND**

Interest in the natural refrigerant CO₂ (R-744) is growing rapidly within the industrial refrigeration sector. Industrial cold storage, food and beverage plants, and process chillers are among the most demanding cooling requirements — spanning a broad temperature range with loads exceeding thousands of tons. Until now, rigorous industrial-duty application requirements have exceeded the capabilities of CO₂ refrigeration technology.

As a leading pioneer in industrial refrigeration technology, Vilter by Copeland has engineered the next breakthrough in CO₂ refrigeration. By optimizing its field-proven, single-screw compressor platform for use with CO₂, Vilter is bringing purpose-built reliability, sustainability and simplicity to CO₂ applications.

The Vilter transcritical CO₂ single-screw compressor unit is rated at up to 124 bar (1,800 psig), delivering all the advantages of single-screw compression technology and sustainable CO₂ refrigeration:



Reliable performance and system design simplicity advantages

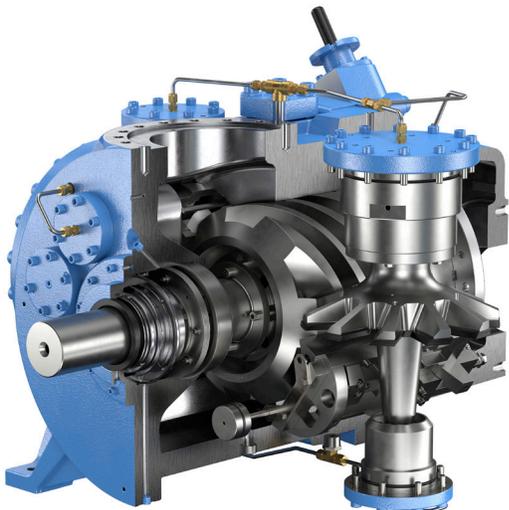


Purpose-built dependability that can withstand the rigors of industrial transcritical CO₂



Natural refrigerant with a GWP of 1 that meets current and future regulatory requirements

Combined with our subcritical CO₂ single-screw compressor, Vilter can offer industrial refrigeration solutions for applications with evaporator temperatures as low as -60 °F — in single- and two-stage configurations.



Why CO₂?

Emergence and characteristics in industrial refrigeration

Industrial companies are evaluating CO₂ refrigeration to address emerging operational and business concerns, which often begin with sustainability initiatives. For companies seeking to move away from higher-GWP hydrofluorocarbon (HFC) refrigerants, CO₂ is a globally accepted alternative for lowering carbon footprints along the road to net zero emissions.

From a safety perspective, some industrial operators are growing weary of the occupational hazards and increasing documentation requirements of ammonia. Complying with the Occupational Safety and Health Administration's (OSHA) ammonia mandates has become increasingly complex over the past several years. Because of ammonia's potential risks, many operators are reluctant to deploy it near densely populated areas.

CO₂ solves many current industrial refrigeration application constraints, but comes with some design challenges. Compression and refrigeration systems must be designed to withstand transcritical pressures up to 1,800 psig and provide suitable efficiencies when operating subcritically. Although multiple-compressor, rack-based systems are viable up to a specific size, higher tonnage requirements push their design limits, add system complexity, and can result in diminishing effectiveness. Meeting high-tonnage loads requires purpose-built, industrial-grade components that won't break down and require frequent maintenance.

The Vilter transcritical and subcritical CO₂ single-screw compressor platforms solve the industrial demands for more robust, reliable and simple CO₂ alternatives. Based on high-pressure application experience in rugged, dirty and open-loop conditions in the renewable natural gas (RNG) industry, Vilter's technological expertise is well-equipped to address today's CO₂ application requirements.

Industrial CO₂ compression starts now

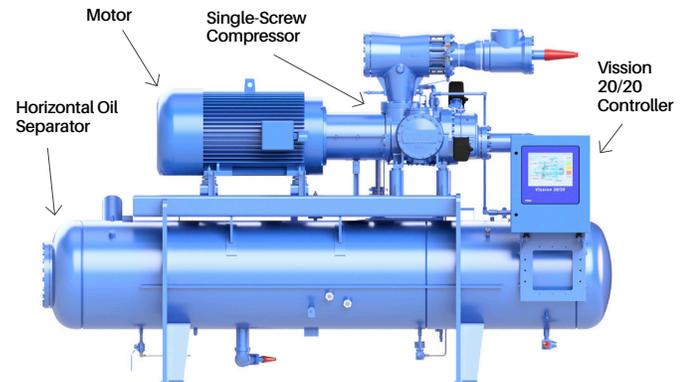
The Vilter transcritical CO₂ single-screw compressor is purpose-built for industrial refrigeration. Individual and multiple compressor configurations can be leveraged to address a wide breadth of tonnage and temperature requirements.

One transcritical CO₂ single-screw compressor can be applied in single-stage, higher-temperature applications, or in a CO₂ two-stage configuration, which also utilizes the subcritical CO₂ single-screw compressor for low-side loads.

Vilter offers solutions in single- and double-compressor configurations. A double-compressor configuration increases unit capacity while sharing common oil management and control systems to reduce costs and application footprint.

Subcritical CO₂ single-screw compressor specs

- 11 compressor models, from 128 to 601 CFM
- 52 bar (754 psig) unit design pressure
- 150- to 845-ton range for low temperature at -20 SST / +20 SCT
- 93- to 485-ton range for ultra-low temperature at -40 SST / +20 SCT
- 100 to 900 HP industrial motor range
- 1,800 to 4,200 RPM rotor speed for a wide operating range
- Parallelex slide valves or variable frequency drive (VFD) for efficient operation
- Horizontal oil separator
- Oil cooling with water/glycol plate heat exchanger or liquid injection
- Vision 20/20 controller with rugged, intuitive, color display that optimizes and protects the compressor unit



Transcritical CO₂ single-screw compressor specs

Single and double units feature:

- 124 bar (1,800 psig) unit design pressure
- 100 to 900 HP industrial motor range per compressor
- 1,200 to 4,200 RPM rotor speed for a wide operating range
- VFD for precise, efficient control
- Vertical oil separator to minimize oil carryover and fouling
- Oil cooling with water/glycol plate heat exchanger for enhanced lubrication
- Vision 20/20 controller with rugged, intuitive, color display that optimizes and protects the compressor unit

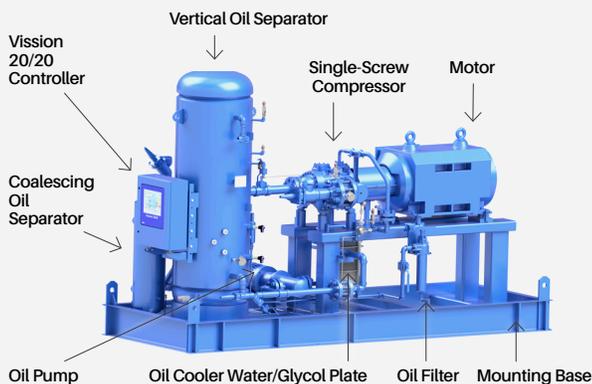
Single unit specs:

- 7 single compressor unit models, from 128 to 243 CFM
- 167- to 366-ton range for medium temperature at 20 °F SST / 85 °F gas cooler temperature

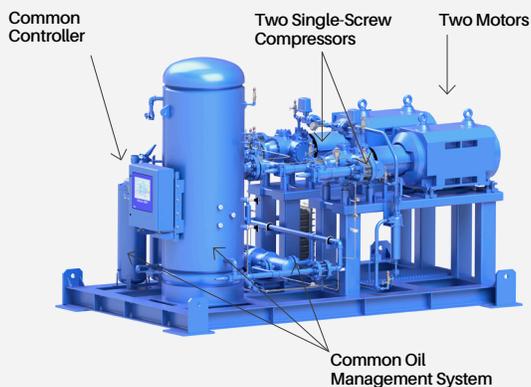
Double unit specs:

- Wide range of double compressor unit models, from 256 to 486 CFM
- 334- to 732-ton range for medium temperature at 20 °F SST / 85 °F gas cooler temperature
- Common oil management and unit controls reduce costs and footprint

SINGLE UNIT



DOUBLE UNIT





Simplify industrial refrigeration

- CO₂ provides a solution to dynamic and uncertain regulations
- Integrates compressors, controls and oil management components to streamline system design
- Delivers high tonnage capacities with fewer industrial compressors
- Operates with fewer system parts — such as pipes, elbows and valves — which reduces potential failure and leak points while making system troubleshooting easier
- Removes the need for superheat which reduces system complexities and increases efficiencies
- Utilizes industrial-grade welded pipe versus brazed copper to reduce leak potential
- Avoids ammonia safety concerns and complexities associated with potential leaks



Purpose-built for industrial rigors

- Supports high tonnage capacities
- Engineered with industrial-grade technology and componentry
- Withstands high transcritical CO₂ pressures
- Meets load demands without requiring superheat



Meet sustainability goals

- Uses natural refrigerant CO₂ with a GWP of 1 to help reach your sustainability goals
- Offers high heat reclamation potential (i.e., water heating, etc.)
- Reduces system footprint, requiring less installation space and saving facility resources
- Includes access to Vilter Lifecycle Services support and CO₂ expertise to help your company solve application challenges



Enhance reliability in industrial refrigeration

- Reduces maintenance costs and prolongs equipment lifespan
- Improves uptime with fewer production shutdowns/delays
- Delivers lower total cost of ownership (TCO)

Advancing the future of industrial refrigeration

The Vilter by Copeland transcritical CO₂ single-screw compressor is the latest innovation in our rich history of groundbreaking advancements for the industrial refrigeration industry. By continuing to invest in commercial and industrial CO₂ refrigeration test labs and research facilities, we're focused on helping you simplify the transition to next-generation refrigeration technologies.

To explore the potential for Vilter transcritical and subcritical CO₂ single-screw compressors in your industrial refrigeration systems, please connect with our application experts at [Vilter.com](https://vilter.com).

To learn more, visit copeland.com

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